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EXPLORER 1 LAUNCHED 20 YEARS AGO

America's first artificial Earth satellite, Explorer 1, was launched 20 years ago Jan. 31.

The 13.9 kilogram (30.8 pound) object, shaped like a stovepipe, 15.2 centimeters (6 inches) in diameter and 203.2 cm (80 in.) long, ushered the U.S. and the western world into the age of space. Explorer 1's principal scientific achievement was a major one -- the discovery of the Van Allen Radiation Belts surrounding Earth.

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Explorer 1 was prepared and launched by two Army organizations which are now elements of NASA: the development group of the Army Ballistic Missile Agency (ABMA), Huntsville, Ala., and the Jet Propulsion Laboratory (JPL), Pasadena, Calif. The development group of ABMA was transferred to NASA and became the nucleus of the new Marshall Space Flight Center in 1960. Some 1,400 employees who helped launch Explorer 1 still work at the Marshall Center. JPL was assigned to the space agency in December 1958.

ABMA provided the modified Redstone booster and the basic satellite design, while JPL furnished the solid propellant upper stages of the carrier vehicle and packaged and tested the payload.

Explorer 1's launch from Cape Canaveral, Fla., by a Jupiter C vehicle came at 10:48 p.m. EST, Jan. 31, 1958, which was 84 days after the Department of Defense gave the Army group the go-ahead to prepare the orbiter as a backup to the existing Vanguard satellite project.

The small satellite dispatched information on the space environment to Earth stations until May 23, 1958, when its batteries were exhausted. The vehicle, however, continued to orbit for several years. It reentered March 31, 1970.

The project that culminated in the launch of the Explorer 1 satellite actually had its beginning several years earlier. As early as 1954, the rocket group at Huntsville, led by the late Dr. Wernher von Braun, had proposed orbiting a satellite with available missile hardware.

The proposed multi-stage vehicle would have a Redstone missile as the first stage and would carry solid-propelled upper stages. JPL and the Office of Naval Research joined the fledgling program, to be called "Project Orbiter." But "Project Vanguard," a Naval Research Laboratory/National Academy of Sciences program, was selected as the nation's satellite program and the Orbiter was shelved.

While the Orbiter proposal was turned down, work did not stop entirely on the multi-stage launch vehicle.

The same combination of a multi-stage vehicle was needed at the time for testing reentry nosecones to be used on ballistic missiles. The von Braun group used the proposed vehicle, called the Jupiter C (Composite Reentry Test Vehicle), to develop ablative type materials for war heads that could withstand the extremely high reentry heat.

The third Jupiter C launched in the reentry heat test series sent a one-third scale model nosecone into space Aug. 8, 1957. The object was recovered from the Atlantic Ocean by the Navy after a flight of 1,930 kilometers (1,200 miles) with a peak altitude of more than 966 km (600 mi.). This was the first U.S. manmade object recovered from outer space and the flight proved the feasibility of the ablative-type nosecone.

During the mid-1950s Marshall Center engineers and scientists did some design work and very modest development work on a satellite. The late Josef Boehm, who worked then in the guidance section and later in the center's Astrionics Laboratory, designed a complete satellite in 1954.

The unofficial satellite program had reached a point by early 1957 where there even was a plan for a satellite tracking computer and data gathering system.

Development problems slowed the Vanguard project and in the wake of the first two Russian Sputnik launchings, the Army was told to be ready to put an American satellite into space. When the Defense Department's Nov. 8, 1957 order came, all that was needed to start things rolling was to fabricate the satellite and assemble the Redstone solid-fuel rocket assembly for the launch vehicle.

JPL fabricated the satellite designed by Boehm. The primary difference in Boehm's proposed satellite and the JPL version was that the cylindrical device was made from metal instead of fiberglass as proposed by Boehm. JPL also provided the solid upper stages.

Dr. James Van Allen, of the State University of Iowa, designed the scientific package carried into space. The radiation detection experiment discovered the Van Allen radiation belt around the Earth, a major scientific finding of the decade. The Explorer 1 launch was a part of this country's participation in the International Geophysical Year.

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